APPENDIX A

METHODOLOGY FOR THE 1997 GENERAL AVIATION AND AIR TAXI ACTIVITY (GAATA) SURVEY

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1. OVERVIEW

In 1993, the name of the General Aviation Activity (GAA) Survey was changed to the General Aviation and Air Taxi Activity (GAATA) Survey to reflect that the survey does include air taxi aircraft. Any aircraft identified as a commuter was excluded from the survey results. The number of computed aircraft types was expanded from 13 to 19 and the minimum manufacturer/model group cell was changed from 20 aircraft to 50 aircraft. Also in 1993, two new use categories, sightseeing and external load, were added. In 1996 another new use category, public use, was added. The survey methods used for the 1997 survey are identical to those used in previous surveys, with the exception that data obtained in the 1996 telephone survey (see section 5.2, Adjustment of the 1997 GAATA Survey Data, on page A-14), have been updated and used to make necessary adjustments to active aircraft and hours flown estimates.

1.1 Purpose of Survey

The purpose of the 1997 General Aviation and Air Taxi Activity (GAATA) Survey is to provide the Federal Aviation Administration (FAA) with information on the activity of the general aviation and air taxi fleets. The information obtained from the survey enables the FAA to monitor the general aviation fleet so that it can, among other activities, anticipate and meet demand for National Airspace System (NAS) facilities and services, assess the impact of regulatory changes on the fleet, and implement measures to assure the safe operation in the airspace of all aircraft.

1.2 Background

Prior to the current survey method, the FAA used the Aircraft Registration Eligibility, Identification, and Activity Report, AC Form 8050-73, to collect data on general aviation activity. The form was sent annually to all owners of civil aircraft in the United States and served two purposes: (1) Part 1 was the mandatory aircraft registration revalidation form, and (2) Part 2 was voluntary and applied to general aviation aircraft only, asking questions on the owner-discretionary characteristics of the aircraft such as flight hours, avionics equipment, base location, and use. This information was used by the FAA to estimate aircraft activity.

In 1978, the FAA replaced AC Form 8050-73 with a new system: Part 1 was replaced by a triennial registration program. In January 1978, the FAA implemented a new procedure, known as triennial revalidation, for maintaining its master file. Instead of requiring all aircraft owners to revalidate and update their aircraft registration annually, FAA only required revalidation for those aircraft owners who had not contacted the FAA registry for three years. This less frequent updating of the master file affected its accuracy and representativeness:

1) the accuracy of current owners and their addresses has deteriorated;

2) the master file contained a residue of aircraft which, under the old revalidation system, would have been deregistered and purged from the file but now remain under the new system.

Part 2 was replaced by the annual General Aviation Activity Survey, FAA Form 1800-54. The 1997 version of Form 1800-54 is shown in Figure A.1. The survey is conducted annually, based on a statistically selected sample of aircraft, and it requests the same type of information as Part 2 of AC Form 8050-73. The first survey took place in 1978, collecting data on the 1977 general aviation fleet. The 1997 statistics in this report were derived from the twentieth survey, which took place in 1998. Benefits resulting from the new system of data collection include quicker processing of the results, improved data quality, and considerable savings in time and money to both the public and the Federal Government.

2. SURVEY COVERAGE

2.1 Aircraft

The 1997 General Aviation and Air Taxi Activity (GAATA) Survey covers, through a stratified probability sample, all civil aircraft registered with the FAA except those operated under Federal Aviation Regulations (FAR) Part 121 as defined in Part 119. These regulations govern operators carrying passengers and cargo for hire. They apply to scheduled operations with ten or more passengers and turbojet operations regardless of the number of passengers. They also apply to supplemental (unscheduled passenger or cargo) operations with more than 30 seats and/or a payload capacity of more than 7,500 pounds. Thus, the survey includes aircraft operating under:

Part 91: General operating and flight rules.

Part 125: Certification and operations: Airplanes having a seating capacity of 20 or more passengers or a maximum payload capacity of 6,000 pounds or more (but not for hire).

Part 133: Rotorcraft external load operations.

Part 135: On-demand (air taxi) and commuter operations not covered by Part 121.

Part 137: Agricultural aircraft operations.

Certain aircraft meeting the above criteria have been excluded from the survey. This group includes N-numbers registered to manufacturers but not associated with a completed aircraft, aircraft in the process of being sold or with registration pending, aircraft with known invalid addresses, and aircraft for which not enough information was available to categorize them properly for sampling purposes.

2.2 Geographic

The sample survey covers general aviation and air taxi aircraft registered with the United States Aircraft Registry as of December 31, 1997. Over 99 percent of these aircraft are registered to owners living in the 50 states; the District of Columbia; Puerto Rico; and other U.S. territories, which include American Samoa, Guam, and the Virgin Islands.[1]

2.3 Content

The survey questionnaire, FAA Form 1800-54 shown previously in Figure A.1, requests the aircraft owner to provide the following information on the sampled aircraft's characteristics and uses for various periods:

1) year aircraft was manufactured, hours by use, IFR hours, percentage of hours flown in Instrument Meteorological Conditions (IMC) and Visual Meteorological Conditions (VMC) during the day and evening, fuel type, and number of local and cross country landings for the entire calendar year 1997; and

2) airframe hour reading and the aircraft's base location as of December 31, 1997.

3. SURVEY METHOD

The survey data were collected by mailing the questionnaire to the owners of the sampled aircraft in three mailings. The first mailing in February, 1998 covered all 29,779 aircraft in the sample and had a response rate of 44.9 percent, as shown in Table A.1. This accounted for approximately 73 percent of the total responses to the survey. The second mailing in April, 1998 included only those aircraft in the sample that had not yet been received or had not yet responded. The second mailing had a response rate of 22.5 percent, which accounted for approximately 19 percent of the total responses to the survey. The third mailing in May, 1998 was sent to the owners of the sampled aircraft who had not responded to the first or second mailings as of a specified date. The third mailing produced a response rate of 10.5 percent, or approximately 8 percent of the total responses to the survey. The overall survey responses resulted in a response rate of 65.4 percent.

TABLE A.1 SUMMARY OF RESPONSE INFORMATION

PHASE	VALID SAMPLE[2]	RESPONSES	RESPONSE RATE	% TOTAL RESPONSE
1st Mailing	29,779	13,384	44.9	73.2
2nd Mailing	15,600	3,508	22.5	19.2
3rd Mailing	13,083	1,376	10.5	8.6
TOTAL:	**27,936[3]**	**18,268[4]**	**65.4[5]**	**100.0**

[1] Source: FAA Aircraft Registration Master File as of December 31, 1997.

[2] The Initial Valid Sample Size includes a total of 158 museum aircraft which were removed from the 1st mailing and considered as inactive aircraft which were not flown in 1997. All 158 museum aircraft are included in the total responses and were made a part of the final survey results. The Initial Valid Sample Size also include 17 aircraft with unmailable addresses and were removed from the 1st mailing. These aircraft were not made a part of the survey processing or of the final survey results.

[3] The Total Valid Sample Size used to compute the overall survey response rate excludes all Postmaster returns (PMRs) and the 158 museum aircraft which were removed from all three mailings.

[4] The total responses include air carrier, commuter, and museum aircraft.

[5] The formula used to compute the overall response rate was Total Number of Responses divided by the Sample Size minus the PMRs (1,843).

Each of the three mailings was accompanied by a cover letter, shown respectively in Figures A.2, A.3, and A.4 at the back of this appendix.

4. SAMPLE DESIGN

4.1 Sample Frame and Size

The FAA Mike Monroney Aeronautical Center in Oklahoma City maintains the Aircraft Registration Master File, which is the official record of registered civil aircraft in the United States.

The sample frame is made up of all aircraft identified as general aviation in the master file (according to the definition in Section 2.1), with the following exceptions:

1) aircraft registered to dealers;
2) aircraft with "Sale Reported" or "Registration Pending" appearing in the record instead of the owner's name;
3) aircraft with a known, inaccurate owner's address; and
4) aircraft with missing state of registration, aircraft make-model- series code, or aircraft type information.

For calendar year 1997, the sample frame consisted of 251,571 general aviation aircraft records from which 29,954 records were sampled, yielding an 11.9 percent sample. Table A.2 shows, by aircraft type, the distribution of the sample compared to that of the population. This clearly demonstrates the disproportionality of the sample to the population, an intended result of the sample design to gain efficiency and to control errors.

4.2 Description of Sample Design

The sample design employed was a stratified, systematic design from a random start. The sample was selected from a two-way stratified frame matrix. The two stratification criteria were:

1) state or territory of aircraft registration, and
2) a variable called the make-model index, constructed from a combination of the aircraft type and the aircraft manufacturer/model group.

The 54 levels of the state criterion and the 261 levels of the make-model index yielded a matrix of 54 by 261 or 14,094 cells (strata) among which the frame was divided for sampling.

The FAA's primary requirement is for estimates of average annual flight hours per aircraft, necessitating optimal determination of sample sizes based on flight hour variation by state and by make-model index, and not on population. Hence, the sample was not proportional to size, and a sampling fraction was determined for each cell with a non-zero population. Sample units were randomly selected within individual cells, yielding a final sample size of 29,954 aircraft.

TABLE A.2 SAMPLE AND POPULATION DISTRIBUTION BY AIRCRAFT TYPE

TYPE	APPROXIMATE POPULATION	SAMPLE SIZE	SAMPLE AS % OF POPULATION
Fixed Wing – Piston			
1 Engine: 1-3 Seats	63,362	7,979	12.59
1 Engine: 4+ Seats	108,203	9,064	8.38
2 Engine: 1-6 Seats	14,840	1,676	11.29
2 Engine: 7+ Seats	6,811	1,135	16.66
Piston: Other	214	70	32.71
Fixed Wing - Turboprop			
1 Engine: Total	730	149	20.41
2 Engine: 1-12 Seats	4,196	647	15.42
2 Engine: 13+ Seats	1,083	730	67.41
Turboprop: Other	110	25	22.73
Fixed Wing - Turbojet			
2 Engine	5,365	789	14.71
Turbojet: Other	709	243	34.27
Rotorcraft			
Piston	3,378	1,130	33.45
1 Engine: Turbine	4,061	1,178	29.01
Multi-Engine: Turbine	1,016	419	41.24
Other Aircraft			
Gliders	2,672	986	36.90
Lighter-than-Air	5,707	1,371	24.02
Experimental			
Amateur	22,468	1,034	4.60
Exhibition	2,694	490	18.19
Other	3,952	839	21.23
TOTAL:	**251,571**	**29,954**	**11.91**

Initially, each aircraft in the sample was given a weight which was the inverse of its cell's sampling fraction, and which corresponded to the number of aircraft in the sample frame represented by that aircraft. When all responses to the survey were tallied, each weight was adjusted according to the response rate for the cell, counting an aircraft for which no survey questions were answered as a non-respondent, and an aircraft for which at least one question was answered as a respondent.

The weight adjustment is described as follows:

1) non-respondents' and postal return weights were changed to zero; and

2) the weights of all responding aircraft were adjusted uniformly by dividing the initial weight by the response rate for the cell.

This method of weight adjustment has several attributes. It actually incorporates the response rates into the final weights and simplifies estimation procedures.

4.3 Error

Errors associated with estimates derived from sample survey results fall into two categories: sampling and non-sampling errors. Sampling errors occur because the estimates are based on a sample rather than the entire population.

Non-sampling errors arise from a number of sources such as non-response, inability or unwillingness of respondents to provide correct information, differences in interpretation of questions, mistakes in recording or coding the data obtained, and others. The following sections discuss the two types of errors.

4.4 Sampling Error

In a designed survey, the sampling error associated with an estimate is generally unknown, but a measurable quantity, known as the standard error, is often used as a guide to the potential magnitude of sampling error. The standard error measures the variation which would occur among the estimates from all possible samples of the same design from the same population. It measures the precision with which an estimate approximates the average result of all possible samples or the result of a survey in which all elements of the population were sampled.

Through sample design techniques, the statistician can control the sizes of standard errors on a few key variables, known as design variables, in the survey. The design variables in the GAATA Survey are the average annual hours flown per aircraft by aircraft type, by aircraft manufacturer/model characteristics and by state of aircraft registration. The sample is designed to produce standard errors on these variables at levels specified by the FAA. No controls are placed on the standard errors of the non-design variables.

An estimate and its standard error make it possible to construct an interval estimate with the prescribed confidence that the interval will include the average value of the estimate from all possible samples of the population. Table A.3, on the following page, shows selected interval widths and their corresponding confidence.

TABLE A.3 CONFIDENCE OF INTERVAL ESTIMATES

WIDTH OF INTERVAL	APPROXIMATE CONFIDENCE THAT INTERVAL INCLUDES AVERAGE VALUE
1 Standard error	68%
2 Standard error	95%
3 Standard error	99%

Every estimate resulting from a sample survey, whether it be for a design or non-design variable, has sampling error associated with it. The user of survey results must consider sampling error along with the point estimate itself when making inferences or drawing conclusions about the sample population. A large standard error relative to an estimate indicates lack of precision and, inversely, a small standard error indicates precision. To facilitate the comparison of estimates and their errors, the tables in this publication display standard errors for all estimated quantities. For the most part, the measure of precision presented in this report is the relative standard error, which is merely the ratio of the standard error to the estimate times 100 (to convert the fraction to a percent). In addition to immediately communicating the relative precision of the estimate, it allows ready comparison of the survey's performance across variables. The following is an example of how to use the relative standard error: from Table 2.1, a 95 percent confidence interval for the number of active rotorcraft with piston engines would be 2,259 plus or minus 2 (6.0/100)(2,259) or the interval between 1,988 and 2,530. One would say with 95 percent confidence that the number of active rotorcraft with piston engines lies somewhere between 1,988 and 2,530. Another way of expressing this is that we are highly confident (95 percent) that the number of active rotorcraft with piston engines is within plus or minus 2(6.0) percent, or 12.0 percent of 2,259.

4.5 Non-Sampling Error

Sampling error can be reduced through survey design, however, the amount of non-sampling error is difficult, if not impossible, to quantify in any given design. There are, however, various techniques which can limit non-sampling error.

Several of these techniques were incorporated into the design of the GAATA Survey and are itemized below:

1) A second and third mailing, including a prompting (reminder) letter, were sent to nonrespondents in addition to the original mailing in order to improve the response rate, since a low response rate is a major cause of non-sampling error.

2) To assure the owners of the confidentiality of their responses, the back side of the questionnaire cover letter informed them that:

   "The information you have provided in the past has never been published or released in any form that would reveal specific information reported by any individually identifiable respondent."[6]

3) Comprehensive editing procedures insured the accuracy of the data transcription to machine readable form and the internal consistency of responses.

[6]See Figure A.2.

4) The official and most accurate source of information available on the general aviation and air taxi fleet, the FAA Aircraft Registration Master File, was used as the sampling frame.

5) Results were adjusted using data from a telephone survey of nonrespondents conducted in 1996. This adjustment is described in Section 5.1, Adjustments Based on the 1996 Telephone Survey of Nonrespondents, on page A-12.

5. RESPONSE RATE

The response rate for 1997 was 65.4%. Possible causes for the less than 100% sample rate response include:

- The deterioration of the currency of aircraft owners' addresses in the Aircraft Registration Master File, the sample frame. This has caused a gradual increase in the percentage of PMRs. For the 1997 Survey, 6% of questionnaires were returned undelivered by the postmaster. It should be noted that PMRs were up by 202 from 1996.

- Repeated sampling of aircraft in two and possibly three or four successive years. Due to the design of the sample to achieve specified precision in estimates for states and manufacturer/model groups of aircraft, it is impossible to avoid sampling some of the same aircraft in consecutive years. Owners of such aircraft may have been less willing to respond. Increasing the minimum cell size may have somehow mitigated the problem in 1997.

Table A.4, on the following page, reveals the responses by aircraft type.

5.1 Adjustments Based on a Telephone Survey of Nonrespondents

From the conduct of the first General Aviation Activity (GAAA) Survey in 1977 through the 1990 Survey year, the survey data were not adjusted to account for nonrespondents (aircraft owners selected as part of the survey sample but who chose not to complete and return the form). This is because telephone surveys of nonrespondents conducted in 1977, 1978, and 1979 did not show any significant differences or inconsistencies between respondents' and nonrespondents' replies. In 1980, the telephone survey was discontinued as a cost-saving measure.

The GAATA Survey response rate has fallen from over 70 percent prior to 1980 to the 60-70 percent range in most years since 1983, and the number of postmaster returns has greatly increased. Therefore, the FAA decided to conduct a telephone survey of nonrespondents to the 1990 GAA Mail Survey. This telephone survey found that there was a significant difference in the ratio of active aircraft and inactive aircraft between mail respondents and telephone respondents. Nonresponse adjustment factors derived from these survey results have been applied to the GAA Survey up through 1995. In 1997, a telephone survey of nonrespondents to the 1996 GAATA Mail Survey was conducted. Again, this survey showed significant differences between

respondents and nonrespondents to the mail survey. This information has been used to correct 1997 estimates for nonresponse bias. The results of this telephone survey have also been integrated into the 1991 through 1996 surveys to estimate more accurately active aircraft and hours flown.

TABLE A.4 RESPONSE RATE BY AIRCRAFT TYPE

TYPE	SAMPLE	PMR's	RESPONSES	RESPONSE RATE
Fixed Wing – Piston				
1 Engine: 1-3 Seats	7,979	460	5,074	67.48
1 Engine: 4+ Seats	9,064	466	5,901	68.63
2 Engine: 1-6 Seats	1,676	121	982	63.15
2 Engine: 7+ Seats	1,135	82	537	51.00
Piston: Other	70	4	33	50.00
Fixed Wing - Turboprop				
1 Engine: Total	149	6	86	60.14
2 Engine: 1-12 Seats	647	36	384	62.85
2 Engine: 13+ Seats	730	33	449	64.42
Turboprop: Other	25	2	13	56.52
Fixed Wing - Turbojet				
2 Engine	789	64	451	62.21
Turbojet: Other	243	18	124	55.11
Rotorcraft				
Piston	1,130	84	545	52.10
1 Engine: Turbine	1,178	66	660	59.35
Multi-Engine: Turbine	419	20	284	71.18
Other Aircraft				
Gliders	986	65	600	65.15
Lighter-than-Air	1,371	140	677	55.00
Experimental				
Amateur	1,034	97	628	72.25
Exhibition	490	29	330	71.58
Other	839	50	510	64.64
TOTAL:	**29,954**	**1,843**	**18,268**	**65.4**[7]

5.2 The Nonrespondent Survey

The substantial nonresponse rate for the GAATA Survey and developments in the sampling frame outlined above have led to a concern that there may be a response bias in the survey, especially with respect to the percent and number of aircraft that are active. The hypothesis is that aircraft of owners that do not respond to the survey are less likely to have been active than aircraft of owners that do. If this hypothesis is correct, the results of the survey overstate the percent and number of active aircraft.

[7] The **65.4** percent response rate is computed by subtracting the Post Master Returns (**1,843**) and museum pieces (**158**) from the total valid sample size of **29,954**

In order to test this hypothesis, and to provide data for adjusting the survey findings, a telephone survey of nonrespondents to the 1996 survey was conducted. This survey focused on two substantive questions:

Was this aircraft flown during calendar year 1996?

If so:

How many hours did this aircraft fly in calendar year 1996?

The survey of nonrespondents also included screening questions to determine whether the respondent still owned the aircraft, and whether the aircraft was flown as an air carrier or commuter.

The survey of nonrespondents was conducted by telephone. The sample for the survey was selected at random from the nonrespondents in the 1996 GAATA Survey sample. The sampling objective was to obtain a sample large enough to achieve 95 percent confidence that the telephone survey estimate of the proportion of nonrespondents with active aircraft would be within 5 percent of the true proportion. The 1996 GAATA telephone sample survey was made up of 1,600 aircraft owners who did not respond to the three mail surveys. The 1996 GAATA telephone survey was conducted in two phases. Phase 1 was conducted from June to September, 1997; Phase 2 was conducted in November and December, 1997. The initial telephone survey did not produce an adequate number of respondents by certain aircraft types. It was therefore necessary to conduct Phase 2 in order to acquire an additional 100 telephone surveys of nonrespondents by those aircraft types which were lacking sufficient numbers to meet the statistical objectives of the telephone sample design. In addition, by the end of the telephone survey the mail questionnaires from 5 aircraft owners in the telephone survey were received, 1 aircraft owner reported that the aircraft was flown out of country throughout Calendar Year 1996, and 14 aircraft were identified as commuter aircraft. These 20 aircraft were eliminated from the overall telephone sample size, reducing the telephone survey sample size to 1,580. Of the aircraft owners in the final sample, telephone numbers could not be obtained for 871 (55.1 percent), 81 (5.1 percent) refused to respond, and 45 (2.8 percent) no longer owned the aircraft or the aircraft owner had passed away and no further questions were asked. A total of 554 (35.1 percent) aircraft owners provided the survey information sought. An additional 29 (1.8 percent) partially completed the telephone survey. The 554 respondents who provided information were adequate to meet the statistical objectives of the telephone sample design.

The principal results of the telephone survey were estimates of the percent of aircraft among GAATA Survey nonrespondents that were active and the average hours flown by these aircraft. Telephone survey results suggest that 69.7 percent of nonrespondent aircraft would have been active in Calendar Year 1996. This is substantially less than the GAATA Survey estimates for 1996 based on respondents only (78.5 percent). The difference between the GAATA Survey respondents and the nonrespondents is statistically significant. Telephone survey results also indicate that the average hours flown by nonresondent aircraft was 142.8, which is higher than the average hours flown estimated from respondents to the 1996 GAATA Survey.

5.3 Adjustment of the 1997 GAATA Survey Data

The 1996 Telephone Nonresponse Survey data were used to adjust the 1997 GAATA Survey results. Adjustments were made for the percent and number of active aircraft and for average hours flows. Total hours flown were adjusted indirectly, since they are derived from the number of active aircraft and average hours flown. In essence, the adjustment was made by replacing the GAATA Survey results for percent active and average hours with weighted averages of the results of the 1997 GAATA Survey and the 1996 Telephone Nonresponse Survey. The exact procedure is described below. The adjustments were made for each aircraft type, but they carry over to results for aircraft groups, regions and states. Adjustments were made in all tables in Chapters 1, 2, 3, 4, 5, 6, and 7 in which the 1997 number or percent of aircraft active, average hours flown, or total hours flown appear.

Weighted averages of the percent of aircraft active and average hours flown were computed as part of the adjustment procedure. The values of percent of aircraft active and average hours flown were taken from the 1997 GAATA Survey results and the 1996 Telephone Nonresponse Survey results. The weights used were the initial weights for the aircraft that responded to the 1997 GAATA Survey and for 1996 GAATA Survey nonrespondents. Weights of the GAATA Survey forms that were returned by the postmaster were not used in the calculations. This "non-treatment" of postmaster returns (PMRs) in the sample has the effect of assuming that PMRs are similar to the average adjusted results. Separate weighted averages were calculated for each of the nineteen aircraft types in the 1997 GAATA survey. The weighted averages for percent of aircraft active were calculated as follows:

$$\frac{\{(\text{Percent Active})_{Ri} \times (\text{Total Weight})_{Ri}\} + \{(\text{Percent Active})_{TRi} \times (\text{Total Weight})_{NRi}\}}{(\text{Total Weight})_{Ri} + (\text{Total Weight})_{NRi}}$$

Where: R = 1996 GAATA Respondents
TR = 1996 Telephone Survey Respondents
NR = 1997 GAATA Nonrespondents
i = Aircraft Type (i = 1 to 19)

The weighted averages for average hours flown were calculated as follows:

$$\frac{\{(\text{Average Hours})_{Ri} \times (\text{Total Weight})_{Ri}\} + \{(\text{Average Hours})_{TRi} \times (\text{Total Weight})_{NRi}\}}{(\text{Total Weight})_{Ri} + (\text{Total Weight})_{NRi}}$$

Where: R = 1997 GAATA Respondents
TR = 1996 Telephone Survey Respondents
NR = GAATA Nonrespondents
i = Aircraft Type (i = 1 to 19)

The actual adjustment to the 1997 GAATA results was made by modifying the final weight of each aircraft that responded to the 1997 GAATA Survey. First, the weighted averages were converted into adjustment factors for each aircraft type, and then the weight of each responding

aircraft was multiplied by the adjustment factor for the aircraft type of that aircraft. The adjustment factors were computed by dividing the weighted averages of the percent active and average hours flown by the unadjusted 1997 GAATA Survey results for these values, i.e.:

$$\frac{(\text{Percent Active})_{WAi}}{(\text{Percent Active})_{Ri}} \quad \text{and} \quad \frac{(\text{Average Hours})_{WAi}}{(\text{Average Hours})_{Ri}}$$

Where: WA = Weighted Average (calculated above)
R = 1997 GAATA Survey Respondents
i = Aircraft Type (i = 1 to 19)

Weights of all aircraft in an aircraft type were adjusted by the same proportional amount. This procedure provided a limited amount of disaggregation of the adjustment. Among other implications of this procedure, all aircraft groups within each aircraft type were also adjusted by the same proportional amount. Adjusting the weights of each individual respondent aircraft allowed results for regions and States to be adjusted, even though the adjustment factors were computed at the aircraft type level. Adjustment at the individual record level also produced adjustments in the standard errors.

In 1997, the adjustment lowered the estimate of total number of active aircraft by 3.7 percent. The number of active aircraft in eight individual aircraft types decreased; two individual aircraft types remained unchanged, and nine individual aircraft types had increased active aircraft populations. The adjustment increased the overall estimate of average hours flown by 2.8 hours or 2.0 percent. Average hours flown was adjusted downward for ten individual aircraft types; two individual aircraft types remained unchanged, while seven individual aircraft types' Average Hours increased. The largest incremental increase in average hours was Experimental Exhibition aircraft. Hours flown were decreased by 2.7 percent, with thirteen individual aircraft types adjusted downward; four individual aircraft types adjusted upward; and two aircraft types remained unchanged.

FIGURE A.2 FIRST COVER LETTER PAGE 1

U.S. Department
of Transportation
**Federal Aviation
Administration**

800 Independence Ave., SW
Washington, DC 20591

February, 1998

Dear Aircraft Owner:

This is the 20th consecutive year that the Federal Aviation Administration (FAA) has conducted the annual General Aviation/Air Taxi Activity and Avionics Survey to gather valuable information on the general aviation and air taxi fleet activities. The information collected in the survey is used both by the FAA and the aviation industry to help pinpoint potential safety problems, forecast FAA future work force needs, forecast new requirements for air traffic facilities, and to form the bases for critical research and analysis of general aviation issues.

The FAA works closely with general aviation industry groups to make this survey clear, concise, and of maximum usefulness to all interested parties. (Please see the enclosed letter from the various industry associations expressing the importance of the information provided by the survey.)
You are one of about 30,000 aircraft owners selected to participate in the 1997 survey. If you have been selected in previous years, it is because the number of aircraft like yours is small. We, therefore, greatly need your response to further validate our results. Enclosed is a questionnaire requesting information for calendar year 1997. Please read the instructions on the back of this letter, and answer all questions for the aircraft identified on the form.

I urge you to complete the questionnaire and use the enclosed postage paid envelope to mail it in today. Your prompt response will preclude you from receiving follow-up letters and questionnaires during the year. All replies to this questionnaire are held by the FAA in the strictest confidence.

If you have any questions or need further assistance, please call the following toll-free number: 1-800-373-9040 and one of my staff will answer your questions. If your call is not returned within 24 hours, please contact me at 202-267-3355.

The FAA and the general aviation industry thank you for your participation.

Sincerely,

Robert L. Bowles
Manager, Statistics and Forecast Branch

Enclosures

FIGURE A.2 FIRST COVER LETTER PAGE 2

The 1997 General Aviation and Air Taxi Activity and Avionics Survey

Why does the FAA collect this information?

For the past 20 years, the FAA has conducted this annual sample survey to collect information on the uses of the general aviation fleet. The information that is collected helps the FAA understand more about general aviation activities, assess the impact of general aviation activities on the National Airspace System, and determine the need for increased traffic facilities and services. These data are used by the Federal, state, and local governments, as well as by private industry and individuals, for safety analyses, planning, forecasting, and research & development. We have made a concerted effort to minimize the number of questions we ask while still meeting the needs of government and the public for aviation information.

How does the FAA handle the survey information?

The information aircraft owners have provided for this survey in the past has never been published or released in any form that would reveal specific information reported by an identifiable respondent.

Why was I selected for this survey?

This survey covers general aviation aircraft and air taxis. The survey sample is randomly selected, based upon the FAA Aircraft Registry as of December 31, 1997. The Registry shows you as a registrant of this aircraft on that date. Your aircraft is one of approximately 30,000 general aviation aircraft selected to be surveyed this year. If you have been selected in previous years, it is because the number of aircraft like yours is small. We, therefore, greatly need your response to further validate our results. When more than one of your aircraft is selected, you will receive, under separate cover, a questionnaire for each aircraft. Please answer all questions for the identified aircraft only. If you cannot provide a precise answer to any questions, make your best estimate.

What should I do if...

- ***If...*** you are no longer in possession of this aircraft but were the registered owner on December 31, 1997, try to answer all the questions. If your aircraft was sold prior to December 31, 1997 ***please forward this mail to the new owner for response.***
- ***If...*** your aircraft was operated by an airline (FAR Part 121), ***indicate this in question 2 and return the questionnaire to the FAA.***
- ***If...*** your aircraft, for whatever reason, was not in use during calendar year 1997, answer questions 4, 5, 6, 7 and 17 and return the questionnaire to the FAA. ***The fact that your aircraft was not flown during the year is just as important as the fact that it was flown.***
- ***If...*** your aircraft was operated primarily by another person or company (e.g., leased), ***please obtain the necessary information from the operator, or forward this mail to the person or firm for response.***
- ***If...*** your aircraft was stolen, destroyed, lost, donated to an organization, or otherwise not in your possession, ***and you have not yet notified the FAA Aircraft Registry in writing, please do so immediately at the following address:***

Aircraft Registration Branch, AFS-750
P. O. Box 25504
Oklahoma City, OK 73125

The signature of the aircraft owner of record is required to make any changes to the aircraft registration record. If you have any questions regarding the registration of your aircraft, please call (405) 954-3116.

- ***If...*** you wish to fax the survey information to us, our FAX No. is: (202) 267-9636
- ***If...*** you have a question about the survey, call us on our toll free number: 1-800-373-9040.

FIGURE A.3 SECOND COVER LETTER PAGE 1

U.S. Department
of Transportation
**Federal Aviation
Administration**

800 Independence Ave., SW
Washington, DC 20591

April, 1998

Dear Aircraft Owner:

We need your input!

In February, we sent you a General Aviation/Air Taxi Activity and Avionics Survey questionnaire to compile 1997 aircraft activity information. We have not received your response.

In case our first mailing never reached you or was misplaced, we have enclosed another identical questionnaire with a return postage-paid envelope for your convenience. Please read the instructions on the back page of this letter, complete the questionnaire, and use the enclosed envelope to return it to us today.

If you have any questions or need further assistance, please call the following toll-free number: 1-800-373-9040 and one of my staff will answer your questions. If your call is not returned within 24 hours, please contact me at 202-267-3355. If your response is already in the mail, we thank you for your cooperation.

We look forward to receiving your response so that the FAA and the general aviation industry can know more about general aviation flying and serve you better. Thank you for your participation.

Sincerely,

Robert L. Bowles
Manager, Statistics and Forecast Branch

Enclosures

FIGURE A.3 SECOND COVER LETTER PAGE 2

The 1997 General Aviation and Air Taxi Activity and Avionics Survey

Why does the FAA collect this information?

For the past 20 years, the FAA has conducted this annual sample survey to collect information on the uses of the general aviation fleet. The information that is collected helps the FAA understand more about general aviation activities, assess the impact of general aviation activities on the National Airspace System, and determine the need for increased traffic facilities and services. These data are used by the Federal, state, and local governments, as well as by private industry and individuals, for safety analyses, planning, forecasting, and research & development. We have made a concerted effort to minimize the number of questions we ask while still meeting the needs of government and the public for aviation information.

How does the FAA handle the survey information?

The information aircraft owners have provided for this survey in the past has never been published or released in any form that would reveal specific information reported by an identifiable respondent.

Why was I selected for this survey?

This survey covers general aviation aircraft and air taxis. The survey sample is randomly selected, based upon the FAA Aircraft Registry as of December 31, 1997. The Registry shows you as a registrant of this aircraft on that date. Your aircraft is one of approximately 30,000 general aviation aircraft selected to be surveyed this year. If you have been selected in previous years, it is because the number of aircraft like yours is small. We, therefore, greatly need your response to further validate our results. When more than one of your aircraft is selected, you will receive, under separate cover, a questionnaire for each aircraft. Please answer all questions for the identified aircraft only. If you cannot provide a precise answer to any questions, make your best estimate.

What should I do if...

- ***If...*** you are no longer in possession of this aircraft but were the registered owner on December 31, 1997, try to answer all the questions. If your aircraft was sold prior to December 31, 1997 ***please forward this mail to the new owner for response.***
- ***If...*** your aircraft was operated by an airline (FAR Part 121), ***indicate this in question 2 and return the questionnaire to the FAA.***
- ***If...*** your aircraft, for whatever reason, was not in use during calendar year 1997, answer questions 4, 5, 6, 7 and 17 and return the questionnaire to the FAA. ***The fact that your aircraft was not flown during the year is just as important as the fact that it was flown.***
- ***If...*** your aircraft was operated primarily by another person or company (e.g., leased), ***please obtain the necessary information from the operator, or forward this mail to the person or firm for response.***
- ***If...*** your aircraft was stolen, destroyed, lost, donated to an organization, or otherwise not in your possession, ***and you have not yet notified the FAA Aircraft Registry in writing, please do so immediately at the following address:***

Aircraft Registration Branch, AFS-750
P. O. Box 25504
Oklahoma City, OK 73125

The signature of the aircraft owner of record is required to make any changes to the aircraft registration record. If you have any questions regarding the registration of your aircraft, please call (405) 954-3116.

- ***If...*** you wish to fax the survey information to us, our FAX No. is: (202) 267-9636
- ***If...*** you have a question about the survey, call us on our toll free number: 1-800-373-9040.

FIGURE A.4 THIRD COVER LETTER PAGE 1

U.S. Department
of Transportation
**Federal Aviation
Administration**

800 Independence Ave., SW
Washington, DC 20591

May, 1998

Dear Aircraft Owner:

The Federal Aviation Administration needs your help. Please participate in the 1997 General Aviation/Air Taxi Activity and Avionics Survey.

In February and April, we sent you a General Aviation/Air Taxi Activity and Avionics Survey questionnaire to compile the 1997 aircraft activity information. We have not received your response.

In case the previous mailings never reached you or were misplaced, we have enclosed another identical questionnaire with a return postage-paid envelope for your convenience. Please read the instructions on the back page of this letter, complete the questionnaire, and use the enclosed envelope to return it to us today.

If you have any questions or need further assistance, please call the following toll-free number: 1-800-373-9040 and one of my staff will answer your questions. If your call is not returned within 24 hours, please contact me at 202-267-3355.

We look forward to receiving your response no later than June 15, so that we can include your input in the 1997 statistics.

If your response is already in the mail, thank you for your cooperation.

Sincerely,

Robert L. Bowles
Manager, Statistics and Forecast Branch

Enclosures

FIGURE A.4 THIRD COVER LETTER PAGE 2

The 1997 General Aviation and Air Taxi Activity and Avionics Survey

Why does the FAA collect this information?

For the past 20 years, the FAA has conducted this annual sample survey to collect information on the uses of the general aviation fleet. The information that is collected helps the FAA understand more about general aviation activities, assess the impact of general aviation activities on the National Airspace System, and determine the need for increased traffic facilities and services. These data are used by the Federal, state, and local governments, as well as by private industry and individuals, for safety analyses, planning, forecasting, and research & development. We have made a concerted effort to minimize the number of questions we ask while still meeting the needs of government and the public for aviation information.

How does the FAA handle the survey information?

The information aircraft owners have provided for this survey in the past has never been published or released in any form that would reveal specific information reported by an identifiable respondent.

Why was I selected for this survey?

This survey covers general aviation aircraft and air taxis. The survey sample is randomly selected, based upon the FAA Aircraft Registry as of December 31, 1997. The Registry shows you as a registrant of this aircraft on that date. Your aircraft is one of approximately 30,000 general aviation aircraft selected to be surveyed this year. If you have been selected in previous years, it is because the number of aircraft like yours is small. We, therefore, greatly need your response to further validate our results. When more than one of your aircraft is selected, you will receive, under separate cover, a questionnaire for each aircraft. Please answer all questions for the identified aircraft only. If you cannot provide a precise answer to any questions, make your best estimate.

What should I do if...

- ***If...*** you are no longer in possession of this aircraft but were the registered owner on December 31, 1997, try to answer all the questions. If your aircraft was sold prior to December 31, 1997 ***please forward this mail to the new owner for response.***
- ***If...*** your aircraft was operated by an airline (FAR Part 121), ***indicate this in question 2 and return the questionnaire to the FAA.***
- ***If...*** your aircraft, for whatever reason, was not in use during calendar year 1997, answer questions 4, 5, 6, 7 and 17 and return the questionnaire to the FAA. ***The fact that your aircraft was not flown during the year is just as important as the fact that it was flown.***
- ***If...*** your aircraft was operated primarily by another person or company (e.g., leased), ***please obtain the necessary information from the operator, or forward this mail to the person or firm for response.***
- ***If...*** your aircraft was stolen, destroyed, lost, donated to an organization, or otherwise not in your possession, ***and you have not yet notified the FAA Aircraft Registry in writing, please do so immediately at the following address:***

Aircraft Registration Branch, AFS-750
P. O. Box 25504
Oklahoma City, OK 73125

The signature of the aircraft owner of record is required to make any changes to the aircraft registration record. If you have any questions regarding the registration of your aircraft, please call (405) 954-3116.

- ***If...*** you wish to fax the survey information to us, our FAX No. is: (202) 267-9636
- ***If...*** you have a question about the survey, call us on our toll free number: 1-800-373-9040.

Figure A.1 SURVEY QUESTIONNAIRE (Front Side)

Form Approved OMB No. 2120-0060

U.S. Department of Transportation
Federal Aviation Administration

1997 GENERAL AVIATION AND AIR TAXI ACTIVITY AND AVIONICS SURVEY

(As of December 31, 1997)

Submission of this form is voluntary. The information you provide will be used only for statistical purposes and will not be published or released in any form that would reveal specific information reported by an individually identifiable respondent.

1A. AIRCRAFT CHARACTERISTICS

If this is not your aircraft, please return the survey form in the enclosed postage-paid envelope.

INSTRUCTIONS: Please answer questions for the aircraft shown in 1A.
Mail the completed questionnaire in the enclosed, postage-paid envelope to1B:

1B. Federal Aviation Administration
800 Independence Ave., SW
APO-110 (Survey)
Washington, DC 20591
FAX No. (202) 267-9636

2. Did you operate this aircraft in 1997 primarily as an air carrier (FAR Part 121 or 127), **...OR** did you lease this aircraft to an air carrier?

a......☐ **YES.** Do not complete the rest of this form. Please return the form to the address shown above in the enclosed postage-paid envelope.

b......☐ **NO.** Please continue completing the rest of this form.

3. Did you operate this aircraft in 1997 primarily as a commuter (FAR Part 135 operator performing scheduled passenger service only) **...OR** did you lease this aircraft to a commuter? a.**.....**☐ YES. b.**.....**☐ NO.

Please continue completing the rest of this form whether you answer YES or NO.

4.	In what State in the U.S. was this aircraft based as of December 31, 1997? (Please use two character State abbreviation)	
5.	In what year was this aircraft manufactured?	
6.	What were the total lifetime airframe hours as of December 31, 1997?	**LIFETIME HOURS**
7.	Was the aircraft flown in Calendar Year 1997? **a.** ☐ **YES** **b.**.....☐ **NO**	
8.	How many hours did this aircraft fly in Calendar Year 1997? (Include estimated rental and leased hours)	**HOURS FLOWN**
9.	What percent of the hours entered in Question 8 did this aircraft fly in each of the following categories?	**PERCENT OF HOURS FLOWN**
	PUBLIC USE- Federal, state or local government owned or leased aircraft used for the purpose of fulfilling a government function ..... **a.**	**%**
	CORPORATE/EXECUTIVE TRANSPORTATION- Company flying **with** a paid, professional crew ..... **b.**	**%**
	BUSINESS TRANSPORTATION- Individual use for business transportation **without** a paid, professional crew ..... **c.**	**%**
	PERSONAL/RECREATIONAL- Flying for personal reasons (excludes business transportation) ..... **d.**	**%**
	INSTRUCTIONAL- Flying under the supervision of a flight instructor (excludes proficiency flight) ..... **e.**	**%**
	AERIAL APPLICATION- Agriculture, health, forestry, cloud seeding, firefighting, insect control, etc ..... **f.**	**%**
	AERIAL OBSERVATION- Aerial mapping/photography, patrol, search and rescue, hunting, highway traffic advisory, ranching, surveillance, oil and mineral exploration, criminal pursuit, fish spotting, etc ..... **g.**	**%**
	EXTERNAL LOAD- Operation under FAR Part 133, rotorcraft external load operations, examples include: helicopter hoist, hauling logs, etc. ..... **h.**	**%**
	OTHER WORK USE- Construction work (not FAR Part 135 operation) parachuting, aerial advertising, towing gliders, etc. ..... **i.**	**%**
	SIGHT-SEEING- Commercial sight-seeing conducted under FAR Part 91 ..... **j.**	**%**
	AIR TOURS- Commercial sight-seeing conducted under FAR Part 135 ..... **k.**	**%**
	COMMUTER–FAR Part 135 **scheduled** passenger service only ..... **l.**	**%**
	AIR TAXI- FAR Part 135 **unscheduled** passenger and all cargo operations ***except*** commuters, air carriers, and air tours ..... **m.**	**%**
	What was the average revenue in dollars per hour for this aircraft in air taxi operations? ..... **n.** **$**	
	OTHER- Experimentation, R&D, testing, Government demonstration, air show, air racing, proficiency flight, etc ..... **o.**	**%**
	TOTAL (a+b+c+d+e+f+g+h+i+j+k+l+m+o)=	**100 %**
10.	Was the aircraft rented or leased to others in 1997? **a.**.....☐ **YES** **b.**.....☐ **NO**	**RENTAL HOURS**
	If "**YES**," for how many rental or leased hours? ..... **c.**	

FAA Form 1800-54 (1-97) ***"PLEASE CONTINUE SURVEY ON BACK PAGE"***

Figure A.1 SURVEY QUESTIONNAIRE (Back Side)

Form Approved OMB No. 2120-0060

NOTE: The total number of hours flown in Question 11 and Question 12 should equal the total number of hours flown in Question 8.

11. In 1997, how many hours were flown under:

	HOURS FLOWN
IFR Flight Plans ..... **a.**	
What percent of the IFR hours were flown under:	PERCENT IFR HOURS FLOWN
Day Instrument Meteorological Conditions (IMC) ..... **b.**	%
Day Visual Meteorological Conditions (VMC) ..... **c.**	%
Night Instrument Meteorological Conditions (IMC) ..... **d.**	%
Night Visual Meteorological Conditions (VMC) ..... **e.**	%
TOTAL (b+c+d+e)=	100 %

12. In 1997, how many hours were flown under:

	HOURS FLOWN
VFR Plans ..... **a.**	
No Flight Plans. ..... **b.**	
Other/Unknown ..... **c.**	
What percent of the hours listed in 12. a. b. and c. did the aircraft fly under:	PERCENT VMC HOURS FLOWN
Day Visual Meteorological Conditions (VMC) ..... **d.**	%
Night Visual Meteorological Conditions (VMC) ..... **e.**	%
TOTAL (d+e) =	100 %

13. How many landings (including water, and touch and go landings) did this aircraft perform in each of the following categories in 1997? **(Enter Number of Landings)**

	NUMBER OF LANDINGS
LOCAL FLIGHTS ..... **a**	
CROSS COUNTRY FLIGHTS ..... **b**	

14 What type of landing gear system does this aircraft have?

FIXED ..... **a.**	
RETRACTABLE ..... **b.**	

15. Does this aircraft have an experimental airworthiness certificate?
a. ..... ☐ YES **b. ..... ☐ NO**

If **YES**, please indicate if the aircraft, as of December 31, 1997, was

☐ **a. In** the test period ☐ **b. Out** of the test period

16. What kind/grade of fuel was primarily used in this aircraft in 1997?

	PLEASE CHECK ONE
Jet Fuel ..... **a.**	
Aviation Fuel: 80 Octane ..... **b.**	
Aviation Fuel: 100 Octane ..... **c.**	
Aviation Fuel: 100 Octane-Low Lead ..... **d.**	
Automotive Gasoline ..... **e.**	
Propane ..... **f.**	
None ..... **g.**	

17. Does this aircraft have an electrical system to operate avionics equipment?

a.....☐ YES

b.....☐ NO

Check all boxes below that reflect this aircraft's avionics equipment capabilities as of December 31, 1997:

Communication Equipment:

360 channel (50kHz channel spacing): (Portable) ..... **c.**	
(Fixed) ..... **d.**	
720 channel or more (25kHz channel spacing): (Portable) ..... **e.**	
(Fixed) ..... **f.**	
HF Radio ..... **g.**	
More than one communication system ..... **h.**	
Cockpit Voice Recorder ..... **i.**	
No Communication Equipment ..... **j.**	

Transportation Equipment

Mode A Transponder (TSO-c74-b/c) ..... **k.**	
Mode C (Altitude Encoding) ..... **l.**	
Mode S Transponder (TSO-c112) ..... **m.**	
TCAS I ..... **n.**	
TCAS II ..... **o.**	
No Transponder Equipment ..... **p.**	

Navigation Equipment:

VOR Receiver: 100 Channel	(Portable) ..... **q.**	
	(Fixed) ..... **r.**	
200 Channel:	(Portable) ..... **s.**	
	(Fixed) ..... **t.**	
More than one VOR Receiver ..... **u.**		
Automatic Direction Finder (ADF) ..... **v.**		
Distance Measuring Equimpent (DME) ..... **w.**		
Area Navigation Equipment (RNAV) ..... **x.**		
Long Range Navigation Equipment (LRNAV) ..... **y.**		
LORAN C: VFR only ..... **z.**		
LORAN C: IFR Enroute–Approved ..... **aa.**		
OMEGA–VLF ..... **bb.**		
Other (Doppler, INS, other) ..... **cc.**		
No Navigation Equipment ..... **dd.**		

Global Position System (GPS):

VFR only ..... **ee.**	
IFR Enroute--Approved ..... **ff.**	
IFR Non precision approach-- Approved ..... **gg.**	

Precision Approach Equipment:

Localizer ..... **hh.**	
Marker Beacon ..... **ii.**	
Glide Slope ..... **jj.**	
No Precision Approach Equipment ..... **kk**	

Guidance and Control Equipment:

Flight Director ..... **ll.**	
Electronic Flight Instrument System (EFIS) ..... **mm.**	
Flight Management System ..... **nn.**	
Autopilot-Axis Controls:.	
Longitudinal ..... **oo.**	
Vertical ..... **pp.**	
Lateral ..... **qq.**	
Approach Mode ..... **rr.**	
Autoland ..... **ss.**	
Flight Data Recorder ..... **tt.**	
No Guidance and Control Equipment ..... **uu.**	

Other Avionics:

Radar Altimeter ..... **vv.**	
Weather Radar ..... **ww.**	
Thunderstorm Detection Equipment ..... **xx.**	
Ground Proximity Warning System ..... **yy.**	

- Agency Display of Estimated Burden of the General Aviation and Air Taxi Activity and Avionics Survey-

The public reporting burden for this collection of information is estimated to average 20 minutes per response. If you wish to comment on the accuracy of the estimate or to make suggestions for reducing this burden, please direct your comments to FAA and the OMB at the following addresses:

U.S. DOT Federal Aviation Administration
800 Independence Avenue, SW
APO-110 (Survey)
Washington, DC 20591

Office of Management and Budget
Paperwork Reduction Project
(2120-0060)
Washington, DC 20503

FAA Form 1800-54 (1-97)